IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Lester F. LUDWIG	Art Unit: 2837
Serial No.: 10/676,249	Examiner: Marlon T. FLETCHER
Filed: September 30, 2003	Conf. No.: 6374
For: MULTI-CHANNEL SIGNAL PROCESSING FOR MULTI-CHANNEL MUSICAL INSTRUMENTS	

SECOND SUPPLEMENTAL APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

This supplemental brief is in furtherance of the Appeal Brief timely filed on July 2, 2009 and the Notification of Non-Compliant Appeal Brief of September 2, 2009. This Supplemental Appeal Brief is timely filed, the date for filing being October 2, 2009.

TABLE OF CONTENTS

I. REAL PARTIES IN INTEREST

The real party in interest in this mater is the sole inventor, Lester F. Ludwig (hereinafter “Appellant”).

II. RELATED APPEALS AND INTERFERENCES

Currently, there are ten other related appeals which have been filed. These appeals have been filed in the following applications:

Docket No.	App. Ser. No.:	App. filing date:	Appeal filed:
2152-3005	09/812,400	March 19, 2001	January 14, 2008
2152-3014	10/676,926	September 30, 2003	March 31, 2008
2152-3028	10/702,941	November 6, 2003	May 18, 2009
2152-3020	10/683,915	October 10, 2003	December 11, 2008
2152-3023	10/680,591	October 6, 2003	January 31, 2008
2152-3026	10/703,023	November 15, 2003	February 16, 2007
2152-3027	10/702,262	November 5, 2003	October 1, 2007
2152-3030	10/702,415	November 6, 2003	August 8, 2008
2152-3043	11/004,746	December 3, 2004	April 2,2009
2152-3044	11/040,163	January 21, 2005	May 11, 2009

Appellant notes that there are four additional pending applications containing substantially the same disclosure as the above-identified applications, and which are assigned to the same Examiner as the present application and the above-mentioned applications. Appellant anticipates that each of the four pending applications, if rejected under similar circumstances as the eleven cases in appeal, may unfortunately also require an appeal to the Board of Appeals and Interferences in order to obtain fair examination. Appellant will endeavor to

update this section of the present Appeal Brief when necessary to reflect the current status of such related appeals.

III. STATUS OF CLAIMS

Claims 1-102 are all the claims in the application and claims 1-102 stand rejected under 35 U.S.C. §102(b) as being anticipated by Hasebe (US 5,990,408). Claims 1, 23, 45, 62, 79, and 91 are the independent claims. A copy of the claims appears in the Appendix of Claims on Appeal attached to the Appeal Brief.

IV. STATUS OF AMENDMENTS

All claims are as originally filed on September 30, 2003, and no amendment has been filed subsequent to the Office Action issued December 2, 2008.

V. SUMMARY OF CLAIMED SUBJECT MATTER

This invention provides a signal processing and signal synthesis technique from a family of signal processing and signal synthesis techniques designed to create new forms of rich musical timbres.

Independent claim 1 describes a multi-channel signal processing system comprising a transducer signal interface, and an output signal interface. The transducer signal interface receives a plurality of distinct incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements (FIG. 51). Each signal processor receives one of the incoming audio electrical signals and processes the incoming audio electrical signal to produce an audio output signal (FIG. 51 and paragraph [0517])[1]. Processing the received incoming audio electrical signal is performed by variably changing one or more signal attributes of the incoming audio electrical signal (FIG. 63, element 6343, paragraph [0616] "This stored program can change the configuration of the control signal routing and control signal processing environment 6301 … as the choice of any of the stored programs in the clusters of specific subsystem elements represented by 6342-6347 … specifically these stored program command paths are as indicated by the arrows in FIG. 63"), the attributes being pitch, timbre, and timing (paragraph [0007], "Each received audio signal channel may be directed to a dedicated or shared signal processor for variably changing selected attributes of pitch, timing, timbre, and amplitude in ways that are unique for each signal."). The output signal interface provides an audio output signal for each of the signal processors (FIG. 51, element 5002, transducer, and paragraph [0517], "Specifically the invention provides for bringing the signals from multi-channel transducers 5002.1-5002.n to individual signal processing stages 5005.1-5005.n before mixing, allowing far more extensive capabilities to be created.").

---

[1] References are to the pre-grant publication, US 2004/0069126 A1.

Claim 23 recites a method for multi-channel signal processing comprising receiving a plurality of distinct incoming audio electrical signals produced in response to vibrations of an associated of vibrating elements (FIG. 54), directing each electrical signal of said plurality of distinct audio electrical signals to a particular signal processor of a plurality of signal processors (FIG. 54, element 5008, paragraph [0544], "FIG. 54 shows another arrangement wherein a switching matrix 5008 is the input mixer 5008 to select which individual vibrating element 5001.1-5001.n signal is assigned to which signal processor 5005.1-5005.k."), and individually processing received incoming audio electrical signals at each processor of said plurality of signal processors (FIG. 63, element 6343, paragraph [0616] "This stored program can change the configuration of the control signal routing and control signal processing environment 6301 … as the choice of any of the stored programs in the clusters of specific subsystem elements represented by 6342-6347 … specifically these stored program command paths are as indicated by the arrows in FIG. 63"), said processing includes variably changing one or more signal attributes of said received incoming audio electrical signal, wherein said one or more signal attributes is selected from the group consisting of pitch, timbre, or timing (paragraph [0007], "Each received audio signal channel may be directed to a dedicated or shared signal processor for variably changing selected attributes of pitch, timing, timbre, and amplitude in ways that are unique for each signal."), wherein said processing results in an audio output signal for each processor of said plurality of signal processors (FIG. 54, signals from elements 5005.1-5005.k to element 5003).

Independent claim 45 recites a signal processing system comprising a transducer signal interface for receiving a plurality of incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements (FIG. 55), a controllable input mixer for selectively mixing said plurality of incoming audio electrical signals to generate a plurality of mixed output signals (FIG. 55, element 5006/5008, paragraph [0545], "FIG. 55 shows a more flexible example method for providing signal processors with vibrating elements' signals and other signal processor outputs via switch matrix, and additional partial mix-

downs by replacing said switch matrix 5008 with an input mixer 5006"), said mixing accomplished by mixing proportions of two or more of said plurality of incoming audio electrical signals to generate said plurality of mixed output signals, wherein said mixing proportions is determined by an incoming mixer control signal (paragraph [0546], "As illustrated in FIG. 56, this is simply a matter of putting all or some combination of the mixers (5003 and/or 5006), switch matrices 5008, signal processors 5005.1-5005.k, and/or synthesizer interfaces, as relevant, under the control of logic circuitry and/or microprocessors 5009 which can provide such preset storage and recall functions"), a plurality of signal processors (FIG 55, elements 5005.1-5005.k), wherein each signal processor of said plurality of signal processors receives at least one of said plurality of incoming audio electrical signals, wherein each processor of said plurality of signal processors process said received incoming audio electrical signals by variably changing one or more signal attributes of said received incoming audio electrical signal, wherein said one or more signal attributes is selected from the group consisting of pitch, timbre, or timing (paragraph [0007], "Each received audio signal channel may be directed to a dedicated or shared signal processor for variably changing selected attributes of pitch, timing, timbre, and amplitude in ways that are unique for each signal."), wherein each processor, of said plurality of signal processors, separately process individual or selected mixes of said received incoming audio electrical signals to produce an audio output signal, and an output signal interface for providing an audio output signal for each processor of said plurality of signal processors (FIG. 55, signals from elements 5005.1-5005.k to element 5006/5008).

Independent claim 62 recites a signal processing method comprising receiving a plurality of incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements (FIG. 56), selectively mixing said plurality of incoming audio electrical signals using a controllable input mixer to generate a plurality of mixed output signals, said mixing accomplished by mixing proportions of two or more of said plurality of incoming audio electrical signals to generate said plurality of mixed output signals (FIG 56, element

5006/5008), wherein said mixing proportions is determined by an incoming mixer control signal, directing each electrical signal of said plurality of distinct audio electrical signals to a particular signal processor of a plurality of signal processors (FIG. 56, element 5009 providing control signals to the input mixer 5006), and individually processing received incoming audio electrical signals at each processor of said plurality of signal processors, said processing includes variably changing one or more signal attributes of said received incoming audio electrical signal, wherein said one or more signal attributes is selected from the group consisting of pitch, timbre, or timing (paragraph [0007], "Each received audio signal channel may be directed to a dedicated or shared signal processor for variably changing selected attributes of pitch, timing, timbre, and amplitude in ways that are unique for each signal."), wherein said processing results in an audio output signal for each processor of said plurality of signal processors (FIG. 56, signals from elements 5005.1-5005.k to element 5006/5008).

Independent claim 79 recites a multi-channel signal processing system (FIG 51) comprising a transducer signal interface (FIG. 51, elements 5001.1-5001.n) for receiving a plurality of distinct incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements (FIG. 51, elements 5001.1-5001.n), a plurality of signal processors FIG. 51, elements 5005.1-5005.n), wherein each signal processor of said plurality of signal processors receives one of said plurality of incoming audio electrical signals, wherein each processor of said plurality of signal processors perform pitch shifts (paragraph [0522], "simulated using pitch shifting") on a received incoming audio electrical signal to produce an audio output signal; and an output signal interface for providing said audio output signal for each of said plurality of signal processors (FIG. 51, signals from elements 5005.1-5005.n to element 5003).

Independent claim 91 recites method for multi-channel signal processing (FIG. 54) comprising receiving a plurality of distinct audio electrical signals (FIG. 54, signals from elements 5002.1-5002.n to element 5008) produced in response

to vibrations of an associated plurality of vibrating elements (FIG. 54, elements 5001.1-5001.n), directing each electrical signal of said plurality of distinct audio electrical signals to a particular signal processor of a plurality of signal processors (FIG. 54, element 5006, paragraph [0544], “input mixer 5008 to select which individual vibrating element 5001.1-5001.n signal is assigned to which signal processor 5005.1-5005.k”), and individually processing received incoming audio electrical signals at each processor of said plurality of signal processors, said processing includes performing pitch shifts (paragraph [0522], “simulated using pitch shifting”) on said received incoming audio electrical signal to produce an audio output signal for each processor of said plurality of signal processors (FIG. 54, signals from elements 5005.1-5005.n to element 5003).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-102 stand rejected under 35 U.S.C. §102(b) as being anticipated by Hasebe (US 5,990,408). The Examiner's §102(b) rejection of the independent claims 1, 23, 45, 62, 79, and 91 is appealed.

VII. ARGUMENT

A. Prosecution History

No claims have been amended or cancelled during prosecution. Claims 1-102 remain pending with claims 1, 23, 45, 62, 79, and 91 being independent claims.

1. First Non-Final Office Action

In the first non-final Office Action dated February 6, 2007, the Examiner rejected independent all claims as being anticipated by Smith et al. (US 6,018,118) stating that Smith elements 102 and 120 read on the transducer interface, Smith elements 110 and 170 read on the plurality of signal processors and the claimed functions of the signal processors, and Smith element 112 reads on the output signal interface. Further the Examiner states that Smith col. 3: 59 – 4: 6 teaches that the processing of the input audio signals is performed by changing one or more of pitch, timbre, and timing. See, OA of February 6, 2007, pp. 2-3.

The basis of the appellant's reply on June 6, 2007 was that Smith's user input device 102 and sensor 120, did not disclose includes "a transducer signal interface for receiving a plurality of distinct incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements" as indicated by the Examiner on page 2 of the OA. In particular, the appellant argued that Smith does not disclose "vibrations" or "vibrating elements", "incoming audio signals", and an "audio output signal".

The appellant further requested should the rejections be maintained in the next Office Action, the Examiner point out the specific portions of Smith, which, in the opinion of the Examiner, contain the alleged teachings, and explain how the cited portions need be interpreted in order to arrive at the Examiner's conclusions as required by MPEP §707.

2. Second Non-Final Office Action

In response, the Examiner issued the second non-final Office Action dated August 28, 2007. In that Office Action, the Examiner stated that the appellant's arguments in response to the Office Action of February 6, 2007 were moot based upon new grounds for rejection. In the current OA, the Examiner rejected all claims as being anticipated by Hasebe (US 5,990,408).

The Examiner stated that Hasebe elements 2 and 3 read on the transducer interface, Smith elements 12-14 and 9 read on the plurality of signal processors and the claimed functions of the signal processors, and Hasebe element 23 reads on the output signal interface. Further the Examiner states that Hasebe col. 4: 30 – 5: 10 teaches that the processing of the input audio signals is performed by changing one or more of pitch, timbre, and timing. The Examiner also indicated that "Smith et al. [sic] discloses the system, wherein at least one processor (19) of said plurality of signal processors is controlled by an incoming signal processing control signal." See, OA of August 28, 2007, pp. 2-3.

In response on January 28, 2008, the appellant presented arguments that Hasebe did not teach "each processor of said plurality of signal processors process a received incoming audio electrical signal to produce an audio output signal" as required by claim 1. In particular, the appellant raised the issue that the OA of January 28, 2008 relies upon pitch and envelope detection sections 12, 13, 14, and 15 of Hasebe as teaching the identified claim element. Applicant argued that these components provide control signals, not the audio output signal as required by claim 1.

Claim also recites "an output signal interface for providing said audio output signal for each of said plurality of signal processors." The Examiner relies upon Hasebe's pitch and envelope detection sections 12 – 15 read upon the output signal interface. As shown in Hasebe FIG. 3, sections 12 – 15 provide signals to the control section 15, and not to the signal processing section 19. Appellant argued that the portions of Hasebe cannot be relied upon this feature.

The appellant also raised the issue that Hasebe's pitch and envelope detection sections 12 – 15, as asserted by the Examiner in rejecting claim 1, do not teach "processing of said received incoming audio electrical signal is performed by variably changing one or more signal attributes of said received incoming audio electrical signal" as required by claim 1. Nothing in Hasebe relates to "variably changing" outputs of the pitch and envelope detection sections 12 – 15.

Once again, the appellant has asked the Examiner to clarify his position that Hasebe's control signals from the pitch and envelope detection sections 12 – 15 read upon claim 1's audio output signals. Applicant believes the Examiner has confused control signals with audio output signals. The outputs of 12-15 are control signals not audio signals.

3. Final Office Action

In the final Office Action of June 2, 2008, the Examiner maintained the previous rejections and made the rejections final. In response to the appellant's arguments of January 28, 2008, the Examiner commented that "[t]he applicant argues that there is no audio output. However, there is clearly audio output. As can be seen at element (20), the digital signal is converted into an analog signal for audio output. The applicant argues the understanding of control signals and audio signals. Clearly there is audio input and audio output." *See*, Final Office Action, p. 4.

In reply to the Final Office Action filed on August 29, 2008, the appellant provided two specific responses to the Examiner's understanding of the appellant's arguments. First, the Examiner misstates the appellant's position that Hasebe's elements 12-15 do not each "produce an audio output signal" required by claim 1. Second, claim 1 does not require a digital signal being converted into an analog signal taught by Hasebe's element 20 as asserted by the Examiner. Relying upon element 20 to support the rejection constitutes a new ground for

rejection. Third, the path 12-15 to 16-19 is a control path, not an audio signal path.

The appellant also reiterated the position that the Examiner had not properly clarified the rejection of claim 1 based upon the Examiner's assertion that elements 12-15 provide audio signals. *See*. Final Office Action, p. 4, ("Control signals are directly related to audio signals in that the control signal is used to change, control, or output audio signal. What would be the purpose of a musical device that did not output audio or sound or a means to produce sound?") Appellant argues that elements 12-15 provide control signals, not audio signals.

The appellant further stated that after carefully reviewing Hasebe, no reference could be found "corrections of detection" as asserted by the Examiner to teach the "variably changing one or more signal attributes" feature of claim 1. *See*, Final Office Action, p. 4, ("The elements (12-15)e use [sic] to detect and provide data which causes changes to the tone data via element (1 6), wherein variables changes are made based on the detections and the corrections to the detections. Therefore, the limitation is met. What would be the purpose of detecting attributes, if no changes are going to be made to the attributes?")

In addition, the appellant again raised the issue that the Examiner failed to address the appellant's argument in the previous response regarding the "output interface." The appellant indicated the Examiner maintained the rejection regarding this claim element without providing any substantive comments with regard to the points raised by the appellant in contradiction to MPEP §707.07(f) which provides "[w]here the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it."

Claim 1 recites "an output signal interface for providing said audio output signal for each of said plurality of signal processors." A review of FIG. 3, element 23, cited by the Examiner for rejecting claim 1, indicates that element 23 is not

provided audio signals from elements 12-15 even if, *arguendo*, elements 12-15 provide audio output signals, which they do not.

4. Third Non-Final Office Action

In response to the appellant's response to the Final Office Action, the Examiner withdrew the finality of the rejections and issued a third non-final office action on December 2, 2008. The Examiner maintained the previous rejections and provided additional comments in the Response to Arguments portion of the Office Action.

> "The applicant continues to argue audio and control signals. The cited reference operates in the same manner as applicant's present invention or application. There is clearly audio output and input. In a broad sense and device that processes the input audio can be considered as a processor. The applicant argues that because devices (12-14) produce control signals, that they can not be considered a signal processor as claimed. The examiner disagrees with the statement. I guess the applicant assumes that the audio input vanishes once it enters the signal processors. Clearly any control signals or attributes become part of the output signal. What would the control signals enhance or vary, if the audio signal no longer exists. These are basic points that the applicant continues argues." Office Action, pp. 4-5.

In response to the third non-final Office Action, the appellant filed a Notice of Appeal on April 2, 2008.

B. <u>The Examiner Has Not Shown That Hasebe Anticipates The Claims</u>

1. Hasebe fails to teach or reasonably suggest processing an incoming audio signal by variably changing one of pitch, timbre, or timing as required by independent claims 1, 23, 45, 62, 79, and 91.

Independent claim 1 recites in part "a plurality of signal processors, wherein each processor … receives a selected one of said plurality of incoming audio electrical signals, wherein each processor … process[es] a received

incoming audio electrical signal to produce an audio output signal, wherein said processing … is performed by variably changing one or more signal attributes …, wherein said one or more signal attributes is selected from the group consisting of: pitch, timbre, or timing." Independent claims 23, 45, and 62 have similar elements. Independent claim 79 recites "each processor … perform[s] pitch shifts on a received incoming audio electrical signal to produce an audio output signal" and independent claim 91 recites similar language.

Each of the independent claims recites that the incoming audio signals may be varied or adjusted in pitch by a signal processor. The Examiner has continually rejected the independent claims as being anticipated under §102 by Hasebe referring the appellant to Hasebe FIG. 3 ("processing of said received incoming audio electrical signal is performed by variably changing one or more signal attributes of said received incoming audio electrical signal (figure 3), wherein said one or more attributes is selected from the group consisting of: pitch, timbre, or timing (column 4, line 30- column 5, line 10; and column 5, line 40 - column 6, line 8)", December 2, 2008 Office Action, pp. 2-3.)

Hasebe relates to a guitar synthesizer in which string vibrations are converted to electrical signals and tones are generated based on the electrical signals. FIG. 3 is a block diagram of the guitar synthesizer, and in particular shows pickup devices 2, 4 providing signals to respective analog-to-digital converters 10-11, and the digital signals are provided to the first and second envelope and pitch detection sections 12-15. A control section 16 receives the signals from the detection sections 12-15, detects the picking positions of the string vibrations, and selects a first and second pitch dataset according to the signals from the pickup devices 2,4 (col. 5:57 – 6:2). The pitch data set is provided to a tone control section that is built into the controller section 16. The control section outputs tone control data sets based on information provided to it (detected picking position datasets and selected pitch data sets). These tone control data sets are provided to the tone generating section 17 as well as to a signal processing section 19. The tone generating section 17 in turn generates

tone data sets (effectively audio signals, not control signals) that serve as inputs to the signal processing section 19.

The control section 16 also provides control signals to the signal processing section 19 for the purpose of adding various sound effects to the twelve audio signals from the analog-to-digital converters 10-11 and the twelve tone signals from the tone generation section 17 (col. 6: 37-50). The resultant signal is passed to a digital-to-analog converter 20, a multiplexer section 21, and a mixer and selector 22 resulting in an audio output signal for reproduction on external equipment.

Each of claims 1, 23, 45, and 62 requires that processing of the received incoming audio signals is performed by variably changing one or more of pitch, timbre, and timing. This feature is not taught or reasonably suggested by Hasebe. Hasebe teaches that a pitch data set is selected for each tone of an audio signal detected by the pickup devices and that this pitch data set is used to augment or modify the audio signal prior to reproduction. Once the pickup devices and pitch and envelope detectors detect a tone, a single pitch data set is selected to modify the tone. In this, there is no teaching that an incoming audio signal is processed by variably changing its pitch. At best, a new audio signal is generated from scratch by tone control signals, in parallel to the incoming audio signals, and that completely new signal may have its own different pitch. This is the only way any new pitch is introduced. The audio signal itself is not shifted to a different pitch by signal processing, but rather may be replaced by a completely different signal independently generated from the separate tone generator 17. The separate tone generator 17 never receives the incoming audio signal. Thus, although a new audio signal may be synthesized under the control of a control signal at a different pitch, the result is not changing a signal attribute of the incoming audio signal.

Hasebe teaches modifying the incoming audio signal with signal processing section 19, but teaches only the adding of various sound effects,

specifically teaching “such as, for example, reverberation and the like” (col.6: 39). The Hasebe sound effects are not taught as sound effects that variably change any of pitch, timbre, and timing as required by the independent claims.

Thus Hasebe teaches only (1) generating a completely different audio signal responsive to controls signals produced by pitch measurements made on the incoming audio signal, and (2) introducing sound effects on an incoming audio signal “such as, for example, reverberation and the like” (col.6: 39).

In either of these, it is clear that Hasebe does not process the incoming audio signal by variably changing at least one of pitch, timbre and timing as required by the independent claims. As a result, the teachings of Hasebe simply do not teach the elements required by the independent claims.

2. Hasebe fails to teach at least one of the signal processors is controlled by an incoming signal processing control signal as recited in dependent claims 2, 24, 58, 59, 75, 76, 80, 92.

The Examiner rejected claims 2, 24, 58, 59, 75, 76, 80, 92 as being anticipated by Hasebe by merely stating Hasebe “discloses the system, wherein at least one processor (19) of said plurality of signal processors is controlled by an incoming signal processing control signal” without providing any rationale for the rejection.

The application specification describes the input control signals coming from other instruments and devices such as a foot controller (see paragraph [0617] and FIG. 63) that are used to control the processing of the incoming audio input signals. Hasebe fails to describe any function or structure that receives an input from outside the system to select or control the pitch data set selection, or control the signal processing section 19. In Hasebe, the only function that controls modifying the audio signal with pitch modulation is the selection of pitch data set. For example, Hasebe FIG. 3 teaches that only the first and second envelope and pitch detection sections select the pitch data set (providing input to

the control section), and that the only input to the detection sections are from the analog-to-digital converters 10, 11 connected to the pickup devices 2, 3. The analog-to-digital converters and pickup devices are not external to Hasebe's system.

For at least this reason, Hasebe does not anticipate the "incoming signal processing control signal" of dependent claims 2, 24, 58, 59, 75, 76, 80, 92.

C. <u>Claims Currently In Condition For Allowance</u>

As set forth in MPEP 2131, to anticipate a claim, the reference must teach every element of the claim. Since, as discussed above, every element of independent claims 1, 23, 45, 62, 79, and 91 is not taught by Hasebe, the appellant submits that these claims are not anticipated by Hasebe and are therefore patentable. Additionally, claims 2-22, 24-44, 46-61, 63-78, 80-90, and 92-102 are patentable at least by virtue of dependence upon a patentable independent claim.

Further, the appellant believes dependent claims , 24, 58, 59, 75, 76, 80, 92 are patentable for at least the separate reason that the Examiner has failed to point out the aspects of Hasebe that he believes anticipates these claims.

The appellant therefore submits that the identified rejections are improper and that the identified claims are allowable over the asserted references. Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the decision rejecting the identified claims and direct the Examiner to pass the case to issue.

Respectfully submitted,

Date: October 2, 2009

By: /C.W. Schmoyer/

Craig W. Schmoyer
Registration No. 51,007
Attorney for Appellant(s)

Customer No. 035884

CLAIMS APPENDIX

1. (ORIGINAL) A multi-channel signal processing system comprising:

a transducer signal interface for receiving a plurality of distinct incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements;

a plurality of signal processors, wherein each processor of said plurality of signal processors receives a selected one of said plurality of incoming audio electrical signals, wherein each processor of said plurality of signal processors process a received incoming audio electrical signal to produce an audio output signal, wherein said processing of said received incoming audio electrical signal is performed by variably changing one or more signal attributes of said received incoming audio electrical signal, wherein said one or more signal attributes is selected from the group consisting of:

pitch, timbre, or timing; and

an output signal interface for providing said audio output signal for each of said plurality of signal processors.

2. (ORIGINAL) The system according to claim 1, wherein at least one processor of said plurality of signal processors is controlled by an incoming signal processing control signal.

3. (ORIGINAL) The system according to claim 1, wherein each processor of said plurality of signal processors provide said processing according to a selected one of a plurality of pre-programmed processing instructions.

4. (ORIGINAL) The system according to claim 3, wherein an incoming signal processing control signal is used to select said one of said plurality of pre-programmed mixing instructions.

5. (ORIGINAL) The system according to claim 1, wherein said plurality of signal processors define first and second groups of signal processors, wherein each signal processor of said first group of signal processors process said received incoming audio electrical signal by variably changing at least one signal parameter selected from the group consisting of:

pitch, timbre, or timing,

wherein said second group of signal processors independently process said received incoming audio electrical signal by variably changing at least one signal parameter selected from the group consisting of

pitch, timbre, or timing.

6. (ORIGINAL) The system according to claim 1, wherein each processor of said plurality of signal processors further process said received incoming audio electrical signal by modulating signal amplitude of said received incoming audio electrical signal.

7. (ORIGINAL) The system according to claim 1, wherein at least one of said plurality of vibrating elements is a tunable, fixed-pitch vibrating element.

8. (ORIGINAL) The system according to claim 1, wherein at least one of said plurality of vibrating elements is a variable-pitch vibrating element.

9. (ORIGINAL) The system according to claim 1, wherein each processor of said plurality of signal processors dynamically modulates the timbre of said received incoming audio electrical signal.

10. (ORIGINAL) The system according to claim 1, wherein each processor of said plurality of signal processors changes the pitch of said received incoming audio electrical signal.

11. (ORIGINAL) The system according to claim 1, wherein each processor of said plurality of signal processors changes the timing of said received incoming audio electrical signal.

12. (ORIGINAL) The system according to claim 1, said system further comprising:

a controllable output mixer for receiving said plurality of audio output signals, wherein said plurality of audio output signals are controllably mixed by said controllable output mixer according to a selected one of a plurality of pre-programmed mixing instructions to produce at least one outgoing mixed audio output signal.

13. (ORIGINAL) The system according to claim 12, wherein an incoming output mixer control signal is used to select said one of said plurality of pre-programmed mixing instructions.

14. (ORIGINAL) The system according to claim 12, wherein said controllable output mixer is controlled in real-time by an incoming output mixer control signal.

15. (ORIGINAL) The system according to claim 12, wherein said at least one outgoing mixed audio output signal comprises a signal of MIDI format.

16. (ORIGINAL) The system according to claim 12, wherein said controllable output mixer receives at least one of said incoming audio electrical signals in addition to said plurality of audio output signals, wherein said controllable output mixer produces said at least one outgoing mixed audio output signal in response to said at least one of said incoming audio electrical signals and said plurality of audio output signals.

17. (ORIGINAL) The system according to claim 1, wherein said variably changing one or more signal attributes of said received incoming audio electrical signal is performed continuously or substantially continuously over a perceptible interval of time.

18. (ORIGINAL) The system according to claim 1, wherein each processor of said plurality of signal processors receives a fixed selection of one of said plurality of incoming audio electrical signals.

19. (ORIGINAL) The system according to claim 18, wherein said selection is determined by a switch.

20. (ORIGINAL) The system according to claim 19, wherein said switch is controlled by stored pre-programmed instructions.

21. (ORIGINAL) The system according to claim 19, wherein said switch is controlled by an incoming switch control signal.

22. (ORIGINAL) The system according to claim 21, wherein said incoming switch control signal comprises a signal of MIDI format.

23. (ORIGINAL) A method for multi-channel signal processing comprising:

receiving a plurality of distinct incoming audio electrical signals produced in response to vibrations of an associated of vibrating elements:

directing each electrical signal of said plurality of distinct audio electrical signals to a particular signal processor of a plurality of signal processors; and

individually processing received incoming audio electrical signals at each processor of said plurality of signal processors, said processing includes variably changing one or more signal attributes of said received incoming audio electrical signal,

wherein said one or more signal attributes is selected from the group consisting of:

pitch, timbre, or timing,

wherein said processing results in an audio output signal for each processor of said plurality of signal processors.

24. (ORIGINAL) The method according to claim 23, wherein at least one processor of said plurality of signal processors is controlled by an incoming signal processing control signal.

25. (ORIGINAL) The method according to claim 23, wherein each processor of said plurality of signal processors provide said processing according to a selected one of a plurality of pre-programmed processing instructions.

26. (ORIGINAL) The method according to claim 25, wherein an incoming signal processing control signal is used to select said one of said plurality of pre-programmed mixing instructions.

27. (ORIGINAL) The method according to claim 23, wherein said plurality of signal processors define first and second groups of signal processors, wherein each signal processor of said first group of signal processors process said received incoming audio electrical signal by variably changing at least one signal parameter selected from the group consisting of:

pitch, timbre, or timing,

wherein said second group of signal processors independently process said received incoming audio electrical signal by variably changing at least one signal parameter selected from the group consisting of

pitch, timbre, or timing.

28. (ORIGINAL) The method according to claim 23, wherein each processor of said plurality of signal processors further process said received incoming audio electrical signal by modulating signal amplitude of said received incoming audio electrical signal.

29. (ORIGINAL) The method according to claim 23, wherein at least one of said plurality of vibrating elements is a tunable, fixed-pitch vibrating element.

30. (ORIGINAL) The method according to claim 23, wherein at least one of said plurality of vibrating elements is a variable-pitch vibrating element.

31. (ORIGINAL) The method according to claim 23, wherein each processor of said plurality of signal processors dynamically modulates the timbre of said received incoming audio electrical signal.

32. (ORIGINAL) The method according to claim 23, wherein each processor of said plurality of signal processors changes the pitch of said received incoming audio electrical signal.

33. (ORIGINAL) The method according to claim 23, wherein each processor of said plurality of signal processors changes the timing of said received incoming audio electrical signal.

34. (ORIGINAL) The method according to claim 23, said system further comprising:

a controllable output mixer for receiving said plurality of audio output signals,

wherein said plurality of audio output signals are controllably mixed by said controllable output mixer according to a selected one of a plurality of pre-programmed mixing instructions to produce at least one outgoing mixed audio output signal.

35. (ORIGINAL) The method according to claim 34, wherein an incoming output mixer control signal is used to select said one of said plurality of pre-programmed mixing instructions.

36. (ORIGINAL) The method according to claim 34, wherein said controllable output mixer is controlled in real-time by an incoming output mixer control signal.

37. (ORIGINAL) The method according to claim 34, wherein said at least one outgoing mixed audio output signal comprises a signal of MIDI format.

38. (ORIGINAL) The method according to claim 34, wherein said controllable output mixer receives at least one of said incoming audio electrical signals in addition to said plurality of audio output signals, wherein said controllable output mixer produces said at least one outgoing mixed audio output signal in response to said at least one of said incoming audio electrical signals and said plurality of audio output signals.

39. (ORIGINAL) The method according to claim 23, wherein said variably changing one or more signal attributes of said received incoming audio electrical signal is performed continuously or substantially continuously over a perceptible interval of time.

40. (ORIGINAL) The method according to claim 23, wherein each processor of said plurality of signal processors receives a fixed selection of one of said plurality of incoming audio electrical signals.

41. (ORIGINAL) The method according to claim 23, wherein said selection is determined by a switch.

42. (ORIGINAL) The method according to claim 41, wherein said switch is controlled by stored pre-programmed instructions.

43. (ORIGINAL) The method according to claim 41, wherein said switch is controlled by an incoming switch control signal.

44. (ORIGINAL) The method according to claim 43, wherein said incoming switch control signal comprises a signal of MIDI format.

45. (ORIGINAL) A signal processing system comprising:

a transducer signal interface for receiving a plurality of incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements;

a controllable input mixer for selectively mixing said plurality of incoming audio electrical signals to generate a plurality of mixed output signals, said mixing accomplished by mixing proportions of two or more of said plurality of incoming audio electrical signals to generate said plurality of mixed output signals, wherein said mixing proportions is determined by an incoming mixer control signal;

a plurality of signal processors, wherein each signal processor of said plurality of signal processors receives at least one of said plurality of incoming audio electrical signals, wherein each processor of said plurality of signal processors process said received incoming audio electrical signals by variably changing one or more signal attributes of said received incoming audio electrical signal, wherein said one or more signal attributes is selected from the group consisting of:

pitch, timbre, or timing,

wherein each processor, of said plurality of signal processors, separately process individual or selected mixes of said received incoming audio electrical signals to produce an audio output signal; and

an output signal interface for providing an audio output signal for each processor of said plurality of signal processors.

46. (ORIGINAL) The system according to claim 45, wherein said incoming input mixer control signal comprises a signal of MIDI format.

47. (ORIGINAL) The system according to claim 45, wherein said controllable input mixer selectively mixes said plurality of incoming audio electrical signals according to a selected one of a plurality of pre-programmed mixing instructions.

48. (ORIGINAL) The system according to claim 45, wherein said controllable input mixer is controlled in real-time by said incoming input mixer control signal.

49. (ORIGINAL) The system according to claim 45, wherein said incoming input mixer control signals is generated by processing at least one of said plurality of incoming audio electrical signals.

50. (ORIGINAL) The system according to claim 45, wherein said plurality of audio output signals are provided to an output mixer to generate a plurality of mixed audio output signals.

51. (ORIGINAL) The system according to claim 50, wherein said output mixer is a controllable mixer, said output mixer mixing proportions of two or more of said plurality of audio output signals to generate said plurality of mixed audio output signals, wherein said mixing proportions of said output mixer is determined by an output mixer control signal.

52. (ORIGINAL) The system according to claim 46, wherein said controllable output mixer selectively mixes said plurality of incoming audio electrical signals according to a selected one of a plurality of pre-programmed mixing instructions.

53. (ORIGINAL) The system according to claim 46, wherein said output mixer control signal comprises a signal of MIDI format.

54. (ORIGINAL) The system according to claim 45, wherein said controllable output mixer is controlled in real-time by said output mixer control signal.

55. (ORIGINAL) The system according to claim 54, wherein said output mixer control signals are generated by processing at least one of said plurality of incoming audio electrical signals.

56. (ORIGINAL) The system according to claim 45, wherein each processor of said plurality of signal processors processes said received incoming audio electrical signals according to a selected one of a plurality of pre-programmed processing instruction.

57. (ORIGINAL) The system according to claim 56, wherein an incoming signal processing control signal is used to select said one of said plurality of pre-programmed processing instruction.

58. (ORIGINAL) The system according to claim 45, wherein at least one processor of said plurality of signal processors is controlled by an incoming signal processing control signal.

59. (ORIGINAL) The system according to claim 58, wherein said signal processing control signals are generated by processing at least one of said plurality of incoming audio electrical signals.

60. (ORIGINAL) The system according to claim 58, wherein said incoming signal processing control signal comprises a signal of MIDI format.

61. (ORIGINAL) The system according to claim 45, wherein said variably changing one or more signal attributes of said received incoming audio electrical signal is performed continuously or substantially continuously over a perceptible interval of time.

62. (ORIGINAL) A signal processing method comprising:

receiving a plurality of incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements;

selectively mixing said plurality of incoming audio electrical signals using a controllable input mixer to generate a plurality of mixed output signals, said mixing accomplished by mixing proportions of two or more of said plurality of incoming audio electrical signals to generate said plurality of mixed output signals, wherein said mixing proportions is determined by an incoming mixer control signal;

directing each electrical signal of said plurality of distinct audio electrical signals to a particular signal processor of a plurality of signal processors; and

individually processing received incoming audio electrical signals at each processor of said plurality of signal processors, said processing includes variably changing one or more signal attributes of said received incoming audio electrical signal, wherein said one or more signal attributes is selected from the group consisting of:

pitch, timbre, or timing,

wherein said processing results in an audio output signal for each processor of said plurality of signal processors.

63. (ORIGINAL) The method according to claim 62, wherein said incoming input mixer control signal comprises a signal of MIDI format.

64. (ORIGINAL) The method according to claim 62, wherein said controllable input mixer selectively mixes said plurality of incoming audio electrical signals according to a selected one of a plurality of pre-programmed mixing instructions.

65. (ORIGINAL) The method according to claim 62, wherein said controllable input mixer is controlled in real-time by said incoming input mixer control signal.

66. (ORIGINAL) The method according to claim 62, wherein said incoming input mixer control signals is generated by processing at least one of said plurality of incoming audio electrical signals.

67. (ORIGINAL) The method according to claim 62, wherein said plurality of audio output signals are provided to an output mixer to generate a plurality of mixed audio output signals.

68. (ORIGINAL) The method according to claim 67, wherein said output mixer is a controllable mixer, said output mixer mixing proportions of two or more of said plurality of audio output signals to generate said plurality of mixed audio output signals, wherein said mixing proportions of said output mixer is determined by an output mixer control signal.

69. (ORIGINAL) The method according to claim 68; wherein said controllable output mixer selectively mixes said plurality of incoming audio electrical signals according to a selected one of a plurality of pre-programmed mixing instructions.

70. (ORIGINAL) The method according to claim 68, wherein said output mixer control signal comprises a signal of MIDI format.

71. (ORIGINAL) The method according to claim 62, wherein said controllable output mixer is controlled in real-time by said output mixer control signal.

72. (ORIGINAL) The method according to claim 71, wherein said output mixer control signals are generated by processing at least one of said plurality of incoming audio electrical signals.

73. (ORIGINAL) The method according to claim 62, wherein each processor of said plurality of signal processors processes said received incoming audio electrical signals according to a selected one of a plurality of pre-programmed processing instruction.

74. (ORIGINAL) The method according to claim 73, wherein an incoming signal processing control signal is used to select said one of said plurality of pre-programmed processing instruction.

75. (ORIGINAL) The method according to claim 62, wherein at least one processor of said plurality of signal processors is controlled by an incoming signal processing control signal.

76. (ORIGINAL) The method according to claim 75, wherein said signal processing control signals are generated by processing at least one of said plurality of incoming audio electrical signals.

77. (ORIGINAL) The method according to claim 75, wherein said incoming signal processing control signal comprises a signal of MIDI format.

78. (ORIGINAL) The method according to claim 62, wherein said variably changing one or more signal attributes of said received incoming audio electrical signal is performed continuously or substantially continuously over a perceptible interval of time.

79. (ORIGINAL) A multi-channel signal processing system comprising:

a transducer signal interface for receiving a plurality of distinct incoming audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements;

a plurality of signal processors, wherein each signal processor of said plurality of signal processors receives one of said plurality of incoming audio electrical signals, wherein each processor of said plurality of signal processors perform pitch shifts on a received incoming audio electrical signal to produce an audio output signal; and

an output signal interface for providing said audio output signal for each of said plurality of signal processors.

80. The system according to claim 79, wherein at least one processor of said plurality of signal processors is controlled by an incoming signal processing control signal.

81. (ORIGINAL) The system according to claim 79, wherein each processor of said plurality of signal processors provide said processing according to a selected one of a plurality of pre-programmed processing instructions.

82. (ORIGINAL) The system according to claim 81, wherein an incoming signal processing control signal is used to select said one of said plurality of pre-programmed mixing instructions.

83. (ORIGINAL) The system according to claim 79, wherein each processor of said plurality of signal processors further process said received incoming audio electrical signal by modulating signal amplitude of said received incoming audio electrical signal.

84. (ORIGINAL) The system according to claim 79, wherein at least one of said plurality of vibrating elements is a tunable, fixed-pitch vibrating element.

85. (ORIGINAL) The system according to claim 79, wherein at least one of said plurality of vibrating elements is a variable-pitch vibrating element.

86. (ORIGINAL) The system according to claim 79, said system further comprising:

a controllable output mixer for receiving said plurality of audio output signals, wherein said plurality of audio output signals are controllably mixed by said controllable output mixer according to a selected one of a plurality of pre-programmed mixing instructions to produce at least one outgoing mixed audio output signal.

87. (ORIGINAL) The system according to claim 86, wherein an incoming output mixer control signal is used to select said one of said plurality of pre-programmed mixing instructions.

88. (ORIGINAL) The system according to claim 86, wherein said controllable output mixer is controlled in real-time by an incoming output mixer control signal.

89. (ORIGINAL) The system according to claim 86, wherein said at least one outgoing mixed audio output signal comprises a signal of MIDI format.

90. (ORIGINAL) The system according to claim 86, wherein said controllable output mixer receives at least one of said incoming audio electrical signals in addition to said plurality of audio output signals, wherein said controllable output mixer produces said at least one outgoing mixed audio output signal in response to said at least one of said incoming audio electrical signals and said plurality of audio output signals.

91. (ORIGINAL) A method for multi-channel signal processing comprising:

receiving a plurality of distinct audio electrical signals produced in response to vibrations of an associated plurality of vibrating elements;

directing each electrical signal of said plurality of distinct audio electrical signals to a particular signal processor of a plurality of signal processors; and

individually processing received incoming audio electrical signals at each processor of said plurality of signal processors, said processing includes performing pitch shifts on said received incoming audio electrical signal to produce an audio output signal for each processor of said plurality of signal processors.

92. (ORIGINAL) The method according to claim 91, wherein at least one processor of said plurality of signal processors is controlled by an incoming signal processing control signal.

93. (ORIGINAL) The method according to claim 91, wherein each processor of said plurality of signal processors provide said processing according to a selected one of a plurality of pre-programmed processing instructions.

94. (ORIGINAL) The method according to claim 93, wherein an incoming signal processing control signal is used to select said one of said plurality of pre-programmed mixing instructions.

95. (ORIGINAL) The method according to claim 91, wherein each processor of said plurality of signal processors further process said received incoming audio electrical signal by modulating signal amplitude of said received incoming audio electrical signal.

96. (ORIGINAL) The method according to claim 91, wherein at least one of said plurality of vibrating elements is a tunable, fixed-pitch vibrating element.

97. (ORIGINAL) The method according to claim 91, wherein at least one of said plurality of vibrating elements is a variable-pitch vibrating element.

98. (ORIGINAL) The method according to claim 91, wherein a a controllable output mixer is used for receiving said plurality of audio output signals, wherein said plurality of audio output signals are controllably mixed by said controllable output mixer according to a selected one of a plurality of pre-programmed mixing instructions to produce at least one outgoing mixed audio output signal.

99. (ORIGINAL) The method according to claim 98, wherein an incoming output mixer control signal is used to select said one of said plurality of pre-programmed mixing instructions.

100. (ORIGINAL) The method according to claim 98, wherein said controllable output mixer is controlled in real-time by an incoming output mixer control signal.

101. (ORIGINAL) The method according to claim 98, wherein said at least one outgoing mixed audio output signal comprises a signal of MIDI format.

102. (ORIGINAL) The method according to claim 98, wherein said controllable output mixer receives at least one of said incoming audio electrical signals in addition to said plurality of audio output signals, wherein said controllable output mixer produces said at least one outgoing mixed audio output signal in response to said at least one of said incoming audio electrical signals and said plurality of audio output signals.

EVIDENCE APPENDIX

No evidence is being entered or relied upon in this Appeal.

RELATED PROCEEDINGS APPENDIX

There has been no Board decision for any of the applications identified in the Related Appeals section of this Appeal Brief.